pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

MEMO

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8/5/2016

DATE August 5, 2016

RE Plan Approval Application Review
Braskem America, Inc.
Marcus Hook Borough, Delaware County
Application No.: **23-0012C**
APS ID: 890017, AUTH ID: 1106345

On January 14, 2015, the Department of Environmental Protection (DEP) received a Plan Approval application (No. 23-0012C) from Braskem America, Inc. (Braskem) for the expansion (debottlenecking) of its existing polypropylene manufacturing plant located at 750 West 10th Street, in Marcus Hook Borough, Delaware County.

Facility Information

The Braskem polypropylene manufacturing plant is a major facility for VOC emissions located in an ozone marginal nonattainment area, and PM2.5 nonattainment area.

The Standard Industrial Classification (SIC) Code for this plant is 2821 - Plastics Material and Synthetic Resins; and the North America Industrial Classification System (NAICS) Code is 325211 – Plastics Material and Resin Manufacturing.

Existing Source Information

The facility is designated into three (3) areas as follows:

- H-5 Area — propylene unloading and storing (Source ID 107)
- Splitter Area — propylene purification (Source ID 106)
- Polymer Units Area — polypropylene production (Source IDs 101A, 101B, 102A, 102B, 103A, and 103B)

The H-5 Area includes refinery grade propylene (RGP) and polymer grade propylene (PGP) unloading from trucks and railcars, and RGP and PGP storage tanks. The VOC emissions from this area are either fugitives or controlled by a flare (Source ID C100) located in the State of Delaware, and owned and operated by Sunoco Partners Marketing and Terminals, LP (SPMT).

The Splitter Area includes RGP and PGP purification and preparation processes. The VOC emissions from this area are either fugitives or controlled by a flare (Source ID C100) located in the State of Delaware, and owned and operated by SPMT.

The Polymer Units Area includes two (2) identical polypropylene production lines Plant 1 and Plant 2. Each plant is divided into three (3) sources based on the emissions types. The following are the source names and IDs in Braskem's TVOP No. 23-00012:

Plant	Source Name (Source ID)	Emission types	Emission Limits
1	Three Storage Silos (101A) Polypropylene MFG Sources (102A) Fugitive Sources (103A)	Stack (S01) Flare (C02) Fugitives (Z01)	37.10 TPY (VOC)
2	Three Storage Silos (101B) Polypropylene MFG Sources (102B) Fugitive Sources (103B)	Stack (S02) Flare (C02) Fugitives (Z02)	24.30 TPY (VOC)

Plant 1 has a polypropylene production rate of 430 million pounds per year (215,000 tons per year), according to RACT Application No. OP-23-0012 submitted in August 1995.

Plant 2 is limited to 240,900 tons polypropylene production per year in the TVOP.

The Project

The project is to increase polypropylene production rate to 68,000 lb/hr (297,840 tons per year) per plant.

To achieve the proposed production rate, the project will involve the modification of the feedstock unloading, splitter, polymerization plant operations, additional piping and fugitive components. The proposed changes that are related to air emission sources are detailed below:

In the H-5 Area, the project will

- Install one (1) refinery grade propylene (RGP) storage bullet (90,000 gallon tank)
- Install piping and fugitive components to:

    - Modify the polymer grade propylene (PGP) railcar unloading process;
    - Connect RGP and PGP feed headers in H-5 and Splitter areas
    - Transfer PGP from the H-5 Area directly to PGP treaters or dryers bypassing a portion of the Splitter area

In the Splitter Area, the project will:

- Re-tray the T-9 De-ethanizer Tower
- Install additional piping and fugitive components to

    - Tie into existing Inter Refinery Pipeline (IRPL) to feed RGP directly to the Splitter Area
    - Tie the polymers propane return line into the propane-propylene treating system and C3 Splitter
    - Install larger PGP transfer pumps.

In the Polymers Units Area, the project will:

- Update the melt pump sizes
- Install larger PGP pumps
- Install additional piping and fugitive components to:

    - Increase the size of the propylene charge pumps; and
    - Increase the capacity of the filters on the Propane Return line.

Railcar Cleaning Station:

In its original PA application, Braskem proposed to install a railcar cleaning station. However, on May 25, 2016, it decided to not construct this station due to financial restraints.

Emission Increases

From Steam Demand Increase

Braskem purchases steam from FPL Energy Marcus Hook (FPL), who operates under TVOP Nos. 23-00084 and 23-00089. The Braskem and FPL facilities are not aggregated for determination of Prevention of Significant Determination (PSD) and Non-attainment New Source Review (NNSR) as determined by DEP and EPA. After consulting with Ms. Gerallyn Duke, EPA Region III, the emission increases from steam demand aren't part of this project.

The Ethylene Complex Flare (Source ID C100) are owned and operated by Sunoco Partners Marketing & Terminals (SPMT). The flare will not be modified, since the increase from this project is within the existing capacities.

Both FPL and SPMT are aware of the respective impacts as a result of this project. The permit for the SPMT flare is under discussions with DNREC.

From Production Increase

The VOC emission increases from the project can be divided into three (3) types:

- Controlled continuous and intermittent emissions
- Uncontrolled intermittent emissions
- Fugitive emissions

The controlled continuous and intermittent emission increases are estimated based on the production rate increase, the numbers of maintenance and/or purge activities, and the flare destruction efficiencies of 98% or 99.5% dependent on which flare is used for controlling emissions.

The uncontrolled intermittent emission increases are from the silos (Source IDs 101A and 101B). The VOC emission increases are calculated using the emission factor from the stack test results and the percent of the production increase.

The fugitive emission increases are from the new leaking components. Braskem estimated the emission increases based on the number of new components, types of these components, and the leak percentages from Braskem's past several years' LDAR data and inspections.

The emission increases of the project include calculations of baseline actual emissions (BAE), projected actual emissions (PAE), and excludible emissions.

BAE

The BAE were based on the 24-month actual emissions from October 2013 through September 2015. The actual VOC and PM emissions of the 24-month period are attached to this review memo (Attachments 1 and 2). The BAE are annualized actual emissions. Table 1 is a summary of the annualized average of the BAEs.

Table 1 – BAE

Pollutants	101A	101B	102A	102B	103A	103B	106	107	Total (BAE)
VOC	2.00	2.12	11.54	6.41	2.78	2.57	9.01	12.03	48.45
PM	0.27	0.28	1.33	1.36	-	-	-	-	3.23

PAE

The PAE were calculated based on "the company's own representations" as required in 25 Pa. Code §127.203a(a)(5)(i)(A). The detailed PAE calculations are attached to this review memo (Attachment 3). Table 2 below is a summary of PAE from this project.

Table 2 - PAE

Pollutants	101A	101B	102A	102B	103A	103B	106	107	Total
VOC	3.17	3.23	13.32	7.86	2.86	2.65	10.23	13.51	56.82
PM	0.48	0.43	3.82	6.20	-	-	-	-	10.92

Excludable Emissions

The excludable emissions for VOC were calculated based on the Baseline to Projected Production Increase and the Baseline to Capable of Accommodating Increase. The actual production rates are attached to this review memo (Attachment 4). Table 3 is a summary of these Baselines.

Table 3 – Baselines for Excludable Emissions

Parameter	**Plant 1**	**Plant 2**
Actual Production (Oct. 2013 – Sept. 2015) (lb/year)	362,647,582	376,495,434
Future projected production rate (lb/year)	595,680,000	595,680,000
Baseline to Projected Production Increase	64.3%	58.2%
Capable of Accommodating Production Baseline (lb/hour)	50,767	55,185
Capable of Accommodating Production Baseline (lb/year)*	430,000,000	481,800,000
Future projected production rate (lb/hour)	68,000	68,000
Future projected production rate (lb/year)	595,680,000	595,680,000
Baseline to Capable of Accommodating Increase	38.53%	23.64%

*: Production limits in current TVOP.

The emission net increases from the project are summarized in Table 4. The emissions were estimated and calculated by Braskem, and verified by DEP and the USEPA.

Table 4 – Net Emission Increases

Sources	101A	101B	102A	102B	103A	103B	106	107	Total
VOC (TPY)									
PAE	3.17	3.23	13.32	7.86	2.86	2.65	10.23	13.51	56.82
BAE	2.00	2.12	11.54	6.41	2.78	2.57	9.01	12.03	48.45
Excludable	0.47	0.66	0.51	0.66	-	-	-	-	2.30
Increases	0.70	0.45	1.27	0.79	0.08	0.08	1.22	1.48	6.07
PM (TPY)									
PAE	0.48	0.43	3.82	6.20	-	-	-	-	10.92
BAE	0.27	0.28	1.33	1.36	-	-	-	-	3.23
Increases	0.21	0.15	2.49	4.84	-	-	-	-	7.69

Regulatory Review

1. Prevention of Significant Deterioration (PSD)

The facility is currently major for VOC emissions only, and is located in an ozone marginal nonattainment area. Therefore, this facility is not a PSD source.

Due to the major facility status, it is needed to determine if the project is subject to PSD. Table 5 shows the emission increases for attainment area pollutants.

Table 5 – PSD Step 1 Analysis

Pollutants	NOx	SO_2	CO	PM	PM10	H_2SO_4	Lead	CO_{2e}
Increases	0.8	0	3.8	7.9	7.9	0	0	35,915
PSD Significant Level	40	40	100	25	15	7	0.6	75,000
PSD Triggered	No	No	No	No	No	No	No	No

Since none of the pollutants emission increases exceeds the PSD significant level, the project is not subject to the provision of PSD.

2. ***NSR – 25 Pa. Code Chapter 127 Subchapter E***

- ***25 Pa. Code §127.201(d) – Significant Emission Increases for VOC and NOx***

As per 25 Pa. Code §127.201(d), this project is not subject to New Source Review (NSR), because the net NOx and VOC emission increases from the project are not significant as determined in accordance with 25 Pa. Code §127.203a(a) (relating to applicability determination). Table 6 shows the emission aggregations in accordance with 25 Pa. Code §127.203a(a)(5).

Table 6 – VOC and NOx Emission Aggregations

PA/RFD	Project Description	Date	Emission (TPY)	
			VOC	NOx
Exemption	Cooling Tower Emission Factor Revision	01/30/2008	1.80	0.00
RFD-495	Propylene Dryers Regeneration Venting	07/15/2008	0.03	0.00
PA-23-0012A	RTO Decommissioning	01/14/2010	4.64	0.00
RFD-3191	Propane Loadout Rack	11/02/2012	0.85	0.00
RFD-3275	Propane Return & H-5 Jumpover	11/02/2012	0.73	0.00
RFD-3276	Moleseive Dryer Recovery	11/02/2012	0.22	0.00
RFD-3309	H-5 Railcar Heel Reduction (Phase 1)	11/14/2012	0.24	0.00
RFD-3187	P-Tank Retrofit	12/05/2012	0.33	0.00
RFD-3706	H-5 Railcar Safety Improvement	06/03/2013	0.47	0.00
RFD-2846	H-5 Railcar Heel Reduction (Phase 2)	08/07/2013	1.65	0.00
RFD-4348	Splitter Sulfur Treatment	04/18/2014	0.59	0.00
RFD-4496	Cooling Tower Optimization	06/13/2014	2.67	0.00
RFD-4912	Splitter #1 Isolation	01/16/2015	0.00	0.00
RFD-5243	Splitter Sulfur Treatment Expansion	08/19/2015	1.53	0.00
23-0012C	Polypropylene Production Expansion	01/14/2016	6.59	0.81
Emission Aggregation (10 Years)			22.34	0.84

25 Pa. Code 127.201 – Significant Emission Increases for PM2.5

PM2.5 emissions increase from the project is included in PM/PM10 emissions, which are below the significant level of 10 TPY. Therefore, the project is not subject to NNSR for PM2.5.

3. *NSPS*

The facility is subject to 40 CFR 60 Subpart DDD - Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry, except the silos (Source IDs 101A and 101B) for the final product. The silos are not subject to the provisions of Subpart DDD, because:

- Plant I "commenced" construction before January 10, 1989, as per 40 CFR §60.560(b)(1)(i) and (ii).

- Plant II emits continuous emissions with a weight percent TOC of less than 0.10 percent, as per 40 CFR §60.560(g). However, the source is required to conduct a test as per 40 CFR §60.564(a)(1) and (d).

  Braskem stated in an email dated May 10, 2016 that there were no planned physical changes and thus no capital expenditure planned for the Source ID 101A – Plant 1 Three Storage Silos. As per 40 CFR §60.14(e)(2), this production rate increase without expenditure is not considered as a "modification".

As per 40 CFR §60.564(a)(1), "Whenever changes are made in production capacity, each owner or operator shall conduct a performance test according to the procedures in this section as appropriate, in order to determine compliance with §60.562-1".

- Braskem is required to conduct a test for Plant 2 silos (Source ID 101B) in order to determine compliance with the TOC weight percent limit of 0.10 percent.

- Braskem is required to conduct a test of the flare (Source ID C01) to demonstrate compliance with 40 CFR §60.18.

The other applicable requirements of 40 CFR 60 Subpart DDD are stated in the current TVOP No. 23-00012. Braskem is required to comply with the requirements that are already specified in TVOP No. 23-00012.

4. *CAM*

40 C.F.R. PART 64 - COMPLIANCE ASSURANCE MONITORING (CAM)

§64.2 Applicability Determination

(a) General applicability. The requirements of this part shall apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies all of the following criteria:

The sources that may be subject to CAM are Source IDs 102A, 102B, 106 and 107.

(1) The unit is subject to an emission limitation or standard for the applicable regulated air pollutant (or a surrogate thereof), other than an emission limitation or standard that is exempt under paragraph (b)(1) of this section;

These sources do not have an emission limitation or standard for regulated air pollutant. However, as per the definition of 40 CFR §64.1, *an emission limitation or standard may be expressed as the relationship of uncontrolled to controlled emissions (e.g., percentage capture and destruction efficiency of VOC).* The flares are required to achieve a VOC destruction efficiency of 95% or 98%.

(2) The unit uses a control device to achieve compliance with any such emission limitation or standard; and

These sources use flares to achieve 95 or 98% VOC destruction efficiencies.

(3) The unit has potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

Each source has potential pre-control device emissions of greater than 100 tons of VOC.

(b) Exemptions—(1) Exempt emission limitations or standards. The requirements of this part shall not apply to any of the following emission limitations or standards:

(i) Emission limitations or standards proposed by the Administrator after November 15, 1990 pursuant to section 111 or 112 of the Act.

Source IDs 106 and 107 are controlled by the flare owned by Sunoco, Inc. (Source ID C100). The flare is required to comply with the provisions of 40 CFR §§60.18 and 63.11. 40 CFR §63.11 was proposed on August 11, 1993. Therefore, Source IDs 106 and 107 are exempt from the provisions of CAM.

Source IDs 102A and 102B are subject to the provisions of 40 CFR 60 Subpart DDD. The emission limitations or standards were proposed on September 30, 1987, which was before November 15, 1990. Therefore, Source ID 102A and 102B are subject to the provisions of CAM. Compliance with CAM is to operate the flare in accordance with 40 CFR §60.18, which includes monitoring and recordkeeping for air flow rate, flow gas Btu, and the existence of the flame.

5. 25 Pa. Code

§127.12(a)(5) – Best Available Technology (BAT)

The project will comply with the provisions of 40 CFR 60 Subpart DDD for VOC emissions, which is considered BAT for the source category.

Complying with 25 Pa. Code §123.13 for PM10 emissions from the silos and the manufacturing baghouses is considered BAT for the source categories. The baghouses are operating at atmospheric temperature, and collecting products. Therefore, PM2.5 emissions are not a concern from the baghouses. Emission limits for PM2.5 is not necessary.

§127.44 – Public Notice

Notice of intent to issue this Plan Approval was published in PA Bulletin on May 28, 2016, and in Delaware County Daily Times on May 28, June 16, and 17, 2016. Comments were received from the USEPA and Braskem. DEP's responses to the comments are attached to this review memo (Response Document).

Recommendation

I recommend that the Plan Approval No. 23-0012C be issued to Braskem America, Inc.

Attachments:

Response Document
1. VOC actual emissions
2. PM actual emissions
3. Projected Actual Emissions (PAE) Calculations
4. Production Rates

Summary of Plan Approval No. 23-0012C:

Event	Regulations	Date	Notes
Submittal of Application	NSPS - DDD BAT CAM	Received on 1/14/2016	
Coordination			No
Acceptance of a complete application		2/2/2016	
Publication in PA Bulletin	Required	5/28/2016	
Publication in local newspaper	Required	5/28, 6/16, and 17, 2016	
Comments from public/applicant received		6/8/2016	Yes
Comments from U.S. EPA Received		6/28/2016	Yes